

TANGENTIAL VELOCITY MEASUREMENT USING INTERFEROMETRIC MTI RADAR

ABSTRACT

Radar systems use time delay measurements between a transmitted signal and its echo to calculate range to a target. Ranges that change with time cause a Doppler offset in phase and frequency of the echo. Consequently, the closing velocity between target and radar can be measured by measuring the Doppler offset of the echo. The closing velocity is also known as radial velocity, or line-of-sight velocity. Doppler frequency is measured in a pulse-Doppler radar as a linear phase shift over a set of radar pulses during some Coherent Processing Interval (CPI). An Interferometric Moving Target Indicator (MTI) radar can be used to measure the tangential velocity component of a moving target. Multiple baselines, along with the conventional radial velocity measurement, allow estimating the true 3-D velocity vector of a target.